Claims

1. Heat sink designed as a flat heat pipe with at least one interior space formed in the body of the heat sink and closed toward the outside with at least one vapor channel or vapor area (18, 18.1), with at least one fluid area or fluid channel (16) that is connected to the vapor channel (18, 18.1) and has a porous or capillary structure, and with several spatially separated posts (6) extending through the interior and between two opposing walls or wall sections delimiting the interior, whereby the posts (6) and the opposing wall sections (3, 4) are all made of a material with high heat conductivity, for example of metal, e.g. copper, **characterized in** that each post (6) is connected at both ends directly with one of the opposing wall sections (3, 4).

7. Heat sink as claimed in claim 1, characterized in that the capillary or porous structure consists of particles (8), which are connected with each other by means of bonding or sintering and/or with an adjacent surface (10) in such a way that capillary flow paths are formed between the particles (8).

8. Heat sink designed as a heat pipe with at least one interior space formed in the body of the heat sink and closed toward the outside with at least one vapor channel or vapor area (18, 18.1), with at least one fluid area or fluid channel (16) that is connected to the vapor channel (18, 18.1) and has a porous or capillary structure, **characterized in** that the capillary or porous structure consists of particles (8) made of ceramic, which are connected with each other and/or with an adjacent surface (10) by means of bonding or sintering, so as to form capillary flow paths between the particles (8).

9. Heat sink as claimed in claim 3, characterized by several spatially separated posts (6) extending through the interior and between two opposing walls or wall sections delimiting the interior, whereby the posts (6) and the opposing wall sections (3, 4) are all made of a material with high heat conductivity, for example of metal, e.g. copper, and whereby each post (6) is connected at both ends directly with one of the opposing walls (3, 4).

10. Heat sink as claimed in one of the foregoing claims, characterized in that that particles are connected with each other by means of metal stays, for example copper stays (9), e.g. by means of copper stays produced through DCB bonding.

11. Heat sink designed as a flat heat pipe with at least one interior space formed in the body of the heat sink and closed toward the outside with at least one vapor channel or vapor area, with at least one fluid area or fluid channel that is connected to the vapor channel and has a porous or capillary structure, **characterized in** that the capillary or porous structure consists at least partially of a loose mass of particles (8) in a space (32), which is separated from the fluid area by an intermediate wall (31).

12. Heat sink as claimed in claim 11, characterized in that the intermediate wall (31) has a plurality of openings.

13. Heat sink as claimed in one of the foregoing claims, characterized in that the particles are such made of metal and/or ceramic.

9. Heat sink as claimed in one of the foregoing claims, characterized in that the capillary structure is formed from at least one ply or layer (7), which is applied at least on part of the inner surface (10) of the wall sections delimiting the at least one interior space (2), and enclosing the posts (6) at their respective connecting areas with these wall sections (3, 4).

10. Heat sink as claimed in one of the foregoing claims, characterized in that the layer forming the capillary structure is applied at least on a partial area of the surface of the posts (6).

11. Heat sink as claimed in one of the foregoing claims, characterized in that the posts (6) have a diameter that is considerably smaller in every direction of the diameter than the dimension of the interior in this direction of the diameter.

12. Heat sink as claimed in one of the foregoing claims, characterized in that between the vapor space (18, 18.1) and the capillary structure forming the at least one fluid channel there is an intermediate wall (17, 17.1, 29).

13. Heat sink as claimed in claim 12, characterized in that the intermediate wall (17, 17.1, 29) is provided with a plurality of openings or is made of a perforated material.

14. Heat sink as claimed in one of the foregoing claims, characterized in that the at least one intermediate wall (17, 17.1) is parallel to the first wall sections (3, 4).

15. Heat sink as claimed in one of the foregoing claims, characterized in that the intermediate wall is formed from a pipe section (29), preferably from a pipe section pressed flat or formed in an oval profile.

16. Heat sink as claimed in one of the foregoing claims, characterized in that at least two capillary structures forming a fluid channel (16) and/or at least two vapor channels (18, 18.1) are provided for.

17. Heat sink as claimed in one of the foregoing claims, characterized in that the first and second wall sections are each formed from plate-shaped walls (3, 4), which together with a peripheral wall (5) delimit the interior of the heat sink.

18. Heat sink as claimed in one of the foregoing claims, characterized in that the first wall sections are formed from areas of a pipe section preferably pressed flat delimiting the interior of the heat sink.

19. Heat sink as claimed in one of the foregoing claims, characterized in that it consists of several plates (3, 4, 19) located one above the other in the manner of a stack and connected with each other at the surfaces, of which plates in the inside of the stack are provided with openings (20) so that these openings form a channel structure through the interior of the heat sink and that the structured plates (19) are supplemented by areas outside of the openings (20) to the continuous posts (6), and

that the material forming the capillary structure is inserted in at least one area (21) of the channel structure.

20. Heat sink as claimed in one of the foregoing claims, characterized in that the interior (26, 28) is formed by at least one depression or recess (25) in one of the plates (23, 24) forming the heat sink.

21. Heat sink as claimed in one of the foregoing claims, characterized in that the particles (8) forming the capillary layer or structure (7) are provided in one layer on the respective surface (10) of the walls delimiting the interior.

22. Heat sink as claimed in claim 21, characterized in that the particles (8) are connected directly with the respective surface (10), for example by means of DCB bonding.

23. Heat sink as claimed in one of the foregoing claims, characterized in that the body of the heat sink is formed from a pipe section (29) that is closed at both ends.

24. Process for manufacturing a heat sink in the form of a heat pipe with at least one vapor channel formed in a closed interior and with at least one fluid channel with a porous or capillary structure, characterized in that the porous or capillary structure is produced by insertion of a mass of particles made of a heat-resistant material, for example ceramic particles (8) and by subsequent DCB bonding upon heating to a bond temperature between 1065 and 1085°C.

25. Process as claimed in claim 24, characterized in that the porous or capillary structure is produced by insertion of a mixture or mass of particles made of the heat-resistant material and pulverized copper oxide or oxidized copper particles and by subsequent DCB bonding.

26. Process as claimed in claim 24 or 25, characterized in that the mass or mixture additionally contains copper particles.

27. Process as claimed in one of the foregoing claims, characterized in that after bonding and cooling, the excess portion of the mass or mixture is removed.

28. Process as claimed in one of the foregoing claims, characterized in that the capillary or porous structure or layer is produced before sealing the interior of the heat sink.

29. Process as claimed in one of the foregoing claims, characterized in that the mass or mixture forming the capillary structure is inserted in the interior through at least one opening and is distributed there before bonding, for example by shaking, vibration and/or turning.

30. Process as claimed in one of the foregoing claims, characterized in that during the manufacture of the porous or capillary structure at least one part of the interior of the heat sink forming a vapor area is filled or kept free by means of a support medium (30, 31) before bonding of the particles forming the porous or capillary structure.

31. Process as claimed in claim 30, characterized in that the support medium (30) is removed after bonding or after manufacturing the porous or capillary structure.

32. Process as claimed in claim 30 or 31, characterized in that the support medium (30) remains in the heat sink.

33. Process as claimed in one of the foregoing claims, characterized in that the support medium (30) is a particle-like medium, for example particles made of the heat-resistant material without the bond material.

34. Process as claimed in one of the foregoing claims, characterized in that support medium is formed from a wall (31), for example from a pipe section forming this wall.